

Dynamics of Lameness in Dairy Cows



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The importance of preventing lameness in dairy cattle is recognized by all those involved in the dairy industry. Everyone recognizes that lame cows are an animal welfare concern, need to be detected as early as possible, and attended to or treated when necessary to mitigate the hoof lesion and underlying cause. Besides being an animal welfare issue, a lame cow has been estimated to cost \$185 for a first lactation cow and \$333 for a mature cow when accounting for reductions seen in milk production and reproductive performance and increased risk of being culled from the herd.

Understand the Behavior of Lame Cows

By increasing our understanding of expected behavioral differences between lame and non-lame cows, we can more quickly detect those cows that are becoming lame and take corrective action. Non-lame dairy cows spend 10 to 14 hours daily resting, averaging 12.9 bouts daily for approximately 1.2 hours per resting bout. Resting time is a high priority for dairy cows and they will forgo time spent eating to allow for adequate resting time. The majority of this resting time is spent resting and ruminating with only approximately 4 hours spent sleeping. Some researchers have equated time spent ruminating to that of deep sleep in humans. Lame cows often change their lying behavior depending on the degree of lameness. Lame cows may increase the length of time of each lying bout and decrease the number of lying bouts per day. Scientists have hypothesized that this change in behavior stems from the reluctance of these cows to stand after lying down because it is painful to stand or lie down.

Resting Surfaces Important Preventative Measure

To rise or recline easily, Holsteins need 38 to 40 inches of head or lunge space. When rising, the cow lunges her body forward with her head almost touching the ground. This movement transfers her weight over her front knees, allowing the cow to raise her hind end. Then, she shifts her weight back to raise her hind end, often times extending a front foot to help push upwards. Our understanding of these movements formed the foundation used when designing comfortable stalls. A soft, conforming surface is needed as the cow drops to the resting surface

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and while resting. To provide this cushioned surface for the hocks, knees, hips, brisket, and shoulders, this surface should be composed of a 6 to 8 inch layer of sand bedding on a firm base or a mattress with 1 to 2 inches of bedding. Unfortunately, rubber mats do not provide the necessary cushioning.

Poor stall design and inadequately bedded surfaces can contribute to more cows becoming lame and also extending the time a lame cow remains lame. Lame cows are more likely to have trouble lying down and rising as they resist putting weight on the affected limb(s). Soft, well bedded, and comfortable resting areas are needed for lame cows to recover. Also, lame cows need more secure footing and traction to help decrease further injuries and improve the confidence of lame cows when attempting to rise and lie down.

Identify Lame Cows

Lame cows have an abnormal gait which often is the result of discomfort resulting from infectious or non-infectious cause(s). Non-lame cows stand and walk with a level back and take long, walking strides. As cows start to become lame, they stand with a flat back, but the back arches when walking and the walking gait is slightly abnormal (mildly lame cows according to Zinpro Locomotion Scoring Chart). As she becomes more lame, her back remains arched when standing or walking and her stride is noticeably shortened. Cows that are classified as lame or severely lame, favor a limb either when walking or while standing. The majority of lameness cases involve the hind feet. By observing the behavior of cows when walking, lameness can be detected early and corrective measures implemented.

The earlier lameness is detected, the underlying cause can be treated, corrected, or housing modifications made. One does need to recognize that lame cows take time to recover, maybe as long as a month or more, and some may not recover. By better understanding normal behavior of cows and how lame cows deviate from these behaviors, one hopefully can intervene quicker and reduce the detrimental effects on performance and animal wellbeing. Observational skills along with the use of new technology tools to detect changes in behavior can help in early detection. These skills are important as the dairy industry continues to strive for 95% or greater cows in US herds being classified as not being lame.

Good Management Practices Can Help Prevent Lameness

Management Action	Why is this practice important?
Daily scrape lots multiple times (2-3 times daily) to prevent cows' hooves from coming in contact with manure and urine	Increased exposure of hooves and feet to manure and urine can increase the incidence of foot rot and digital dermatitis (hairy heel warts). Also, moist hooves are softer and may be more susceptible to injury from small stones or rough concrete lane surfaces used to move cows.
Trim feet twice yearly, usually at dry off and 80 to 120 days in milk. Cows should be examined twice yearly and trimmed only if needed.	Make sure cows distribute their weight evenly over the claw. The majority of the weight is carried by the outer part of the claw. Hooves grow in length about 2 inches per year.
Proper use of footbaths to prevent hairy heel warts	Prevent infectious diseases of the hoof
Minimize standing time on concrete surfaces and properly grove concrete surfaces for the best traction.	Provide comfortable, well-bedded, and properly-designed freestalls for cows to lie down and chew their cuds. Do not overcrowd the freestall barn- enough stalls are needed so that the timid heifer can "find her own stall". (fresh cows < 100% stocking density, other groups < 120%)
After feeding, the majority of the herd should be lying down in stalls and chewing their cuds	If cows are not using the stalls properly, investigate how to improve their usage (Are the stalls the proper length? Do cows have adequate lunge space to get up and to lie down? Are the stalls comfortable?)
Hock Lesions	Adequate bedding is needed in the rear of the stall to prevent lesions. (With mattresses, 3 inch of bedding should cover the back of the stall.)